

Guideline for Industrial Waste Discharges in the NWT

1 Introduction

1.1 Definitions

2 Roles and Responsibilities

2.1 Environmental Protection Service

2.2 Industry

2.3 Other Regulatory Agencies

3 Standards

3.1 Effluent

3.1.1 Process Effluent

3.1.2 Non-point Source Discharges

3.2 Process Residuals

3.3 Exemptions

4 Waste Management

4.1 Pollution Prevention

4.2 Disposal/Treatment

Figure 1: Decision Flow chart for Managing an Industrial Waste Discharge

4.2.1 Effluent Discharge

4.2.2 Process Residuals

4.2.3 Containers

4.3 Alternative Methods

5 Conclusion

Schedule (I) Standards for Process Effluent Discharged to Municipal Sewage Systems

Schedule (II) Standards for Non-point Source Discharges

**Schedule (III) Standards for Solid Waste/Process Residuals Suitable for Landfill
(Leachate Quality criteria test results not to exceed 100 mg/L)**

**Schedule (IV) Standards for Solid Waste/Process Residuals Suitable for Landfill
(based on Leachate Quality criteria test results)**

6 Bibliography

Appendix

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1 Introduction

The purpose of this guideline is to establish standards that should be followed in the discharge of waste from an industrial operation on Commissioner's Land or lands administered by municipal governments in the Northwest Territories (NWT).

This guideline has been developed by the Environmental Protection Service (EPS) of the Department of Resources, Wildlife and Economic Development (RWED). It is also intended to:

- C provide direction for the management and discharge of industrial waste,
- C protect the environment,
- C protect municipal infrastructure, such as sewage systems and solid waste modified landfills, from immediate and long term environmental problems, and
- C protect workers and the public from improper industrial waste discharge.

This guideline addresses the discharge of effluent and process residuals resulting from industrial operations. Effluent refers to a liquid material while process residuals refer to solid, semi-solid or sludge waste. The guideline is intended for the discharge of waste into municipal systems not discharges from municipal systems.

Specific guidelines have been developed for major hazardous and industrial waste. Contact the Environmental Protection Service (EPS) for a listing of these guidelines.

The guideline has been developed in conjunction with the Government of the Northwest Territories' (GNWT) Department of Municipal and Community Affairs, taking into consideration northern conditions. It provides general directions to be used for all industries except those operating under a Northwest Territories Water Board water licence. Section 2.2 of the *Environmental Protection Act* (EPA) gives the Minister of Resources, Wildlife and Economic Development the authority to develop, coordinate and administer guidelines. This guideline complements existing acts and regulations concerning waste which should be consulted for interpretation and application. Section 2.3 of this guideline provides additional information on regulatory roles and responsibilities.

1.1 Definitions

BOD	Biochemical oxygen demand. A measure of the amount of oxygen that bacteria consume in the process of oxidizing organic matter. This is determined by Test Method 507 in Standard Methods.
<i>Composite sample</i>	A volume of effluent made up of three or more individual samples of equal volume, equal weight, or sized proportionally to flows, that have been combined. The samples are taken at intervals during the sampling period.

<i>Contaminant</i>	<p>Any noise, heat, vibration or substance and includes such other substances as the Minister may prescribe that, where discharged into the environment,</p> <p>(a) endangers the health, safety or welfare of persons,</p> <p>(b) interferes or is likely to interfere with normal enjoyment of life or property,</p> <p>(c) endangers the health of animal life, or</p> <p>(d) causes or is likely to cause damage to plant life or property.</p> <p style="text-align: right;">Environmental Protection Act</p>
<i>Commissioner's Land</i>	<p>Lands in the Northwest Territories that have been transferred by Order-in-Council to the Government of the Northwest Territories. This includes highways, block land transfers and most lands within municipalities.</p>
<i>Dangerous goods</i>	<p>Any product, substance or organism included by its nature or by the <i>Transportation of Dangerous Goods Regulations</i> (TDGR) in any of the classes listed in the schedule provided in the <i>Transportation of Dangerous Goods Act</i> (TDGA).</p> <p style="text-align: right;">Transportation of Dangerous Goods Act (Canada)</p>
<i>Effluent</i>	<p>Liquid material, treated or untreated, discharged from industrial sources.</p>
<i>Empty container</i>	<p>A container that has been emptied to the greatest extent possible, using regular handling procedures, such that its contents shall not exceed 1% of the containers's original capacity or 2 litres whichever is less. This does not include containers which previously contained mercury or class 2.3, 5.1, 6.1 materials of TDGR.</p>
<i>Generator</i>	<p>The owner or person in charge, management or control of a waste or a facility that generates waste.</p>
<i>Hazardous waste</i>	<p>A contaminant which is a dangerous good that is no longer used for its original purpose and is intended for storage, recycling, treatment or disposal:</p> <p>A hazardous waste does not include a contaminant that is:</p> <p>(a) household in origin,</p> <p>(b) included in class 1, Explosives or class 7, Radioactive materials of TDGR,</p> <p>(c) exempted as a small quantity,</p> <p>(d) an empty container, or</p> <p>(e) intended for disposal in a sewage system or by land filling that meet the applicable standards set out in schedules I, III or IV of the <u>Guideline for Industrial Waste Discharges in the NWT</u>.</p>

<i>Industrial</i>	Any enterprise involved with manufacturing, fabricating, processing including commercial or institutional operations.
<i>Landfilling</i>	The deposit of waste on land as described in the Department of Municipal and Community Affairs <u>Guidelines for the Planning, Design, Operation & Maintenance of Solid Waste Modified Landfill Sites in the Northwest Territories.</u>
<i>Leachate extraction procedure</i>	A test method designed to determine both the organic and inorganic parameters present in solid and multi phased waste. It is designed to simulate the characteristics a material may exhibit if placed in a landfill. Test determined by method 1311 Toxicity Characteristic Leaching Procedure Test, US EPA or Leachate Extraction Procedure 164-GP-1-MP Canadian General Standards Board.
<i>Non-Point source discharge</i>	A non-specific or diffuse source of effluent entering the environment. This includes run off from areas such as compounds, storage sites and storage yards.
<i>Oil & grease</i>	A term given to any material in the sample which can be extracted into an organic solvent after the sample has been acidified. Material can include vegetable oils, animal fats, greases ,waxes, organic dyes and petroleum hydrocarbons. This is determined by one of Test Methods 503A, 503B, 503C or 503D in Standard Methods.
<i>Process residuals</i>	Solid, semi-solid or sludge waste resulting from industrial operations.
<i>Phenolic compounds</i>	Hydroxyl derivatives of benzene and its condensed nuclei which can be determined as phenols. This is determined by one of Test methods 510B or 510C in Standard Methods.
<i>Sewage system</i>	A system for the collection, transmission, treatment or disposal of any liquid waste containing animal, vegetable, mineral, human or chemical matter in solution or in suspension.
<i>Standard methods</i>	A procedure set out in <u>Standard Methods For the Examination of Water and Wastewater</u> published jointly by the American Public Health Association, American Water Works Association and Water Pollution Control Federation, current at the date of testing.
<i>TDGA/TDGR</i>	The <i>Transportation of Dangerous Goods Act and Regulations</i> (Canada).
<i>Total suspended solids</i>	The amount of solid residue suspended in a liquid portion of sample. The test is completed by measuring the amount of solids left behind on a filter paper after the sample has been filtered. This is determined by Test Method 209C in Standard Methods.
<i>Toxic leachate</i>	A process residual that does not meet the requirements as set out in section 3.2 of this guideline.

2 Roles and Responsibilities

2.1 Environmental Protection Service

The Environmental Protection Service (EPS) of the Department of Resources, Wildlife and Economic Development is the Government of the Northwest Territories' (GNWT) agency responsible for initiatives which control the discharge of contaminants and their impact on the natural environment. EPS is responsible for ensuring that environmentally acceptable management procedures, emission levels and disposal methods are maintained. By practise the EPS's programs are applied primarily to Commissioner's Land, lands administered by municipal governments or GNWT undertakings. Legislative authority is provided by the *Environmental Protection Act* (EPA) and *Pesticide Act*. Contact EPS for a listing of relevant regulations and guidelines.

2.2 Industry

The responsibility for proper waste management rests with the generator and should be considered part of the cost of doing business.

Industry should develop a comprehensive operating program that ensures the impacts of its operations on the natural environment and workplace are minimized. This involves developing sound waste management practices for effluent, process residuals, spent chemicals, solid waste, sludges and empty containers.

This guideline is a starting point in the proper management of a waste. Industry should determine the nature of the waste and manage it accordingly. If the waste discharge is considered a hazardous waste then the generator should refer to and follow the Guideline for the General Management of Hazardous Waste in the NWT.

2.3 Other Regulatory Agencies

The GNWT Department of Municipal and Community Affairs (MACA) administers Commissioner's Lands. MACA's responsibilities include the issuance and inspection of leases, licences and land use permits. MACA is also involved in the planning, funding, operation and maintenance of municipal landfill and sewage treatment systems. Under MACA's direction, some communities are developing sewage discharge guidelines which this guideline will supplement.

The Northwest Territories Water Board issues water licences under the federal *Northwest Territories Waters Act*. One criterion for an industrial process to require a water licence is if its water use and waste deposit exceeds 100 m³/ day. A water license may set specific industrial effluent discharge parameters that must be complied with. A water licence supersedes the requirements of this guideline. Please consult the Department of Indian and Northern Affairs for further water licence criteria.

Environment Canada also regulates certain industrial discharges. Subsection 36(3) of the *Fisheries Act* states that,..." in the absence of regulations, effluent entering fish bearing waters must be non-deleterious to fish". The *Metal Mining Liquid Effluent Regulations* and the *Petroleum Refinery Liquid Effluent Regulations* pursuant to the *Fisheries Act* regulate effluent quality for those specific industries.

Under the NWT *Safety Act*, *Occupational Health and Safety Regulations* address the safety of workers and the work place. The Act states that the employer shall maintain their establishment and take all reasonable precautions to ensure the safety and health of every person in the establishment. The Regulations also prescribe standards for protective clothing and equipment to be used by workers. *Work Site Hazardous Materials Information System Regulations* (WHMIS) were adopted to ensure employee training and safe storage and handling of controlled products at the employer's work site. Consultation with a Safety Officer from the Prevention Services Division of the Workers' Compensation Board is the responsibility of every waste generator or employer.

The GNWT Department of Transportation, Motor Carrier Services, is responsible for administering the *Transportation of Dangerous Goods Act and Regulations* (NWT). The Department is also responsible for driver, vehicle and load safety under additional transport legislation.

3 Standards

The following sections outline requirements for the discharge of effluent to sewage systems and the disposal of process residuals to a landfill.

3.1 Effluent

Unless meeting the standards set out by the guideline, discharges could become a hazard to persons, property or the environment or interfere with the operation of municipal infrastructure. These should not be discharged. Where a sample is required for the purpose of determining effluent characteristics, the sample must be a composite sample which can be collected manually or by using an automatic sampling device. Standard Methods, or an equivalent level of testing, must be followed to determine effluent characteristics.

3.1.1 Process Effluent

Properly managing process effluent is an important aspect of maintaining water quality. The discharge limits for process effluent in this guideline are based on objectives for municipal sewage systems.

Schedule I contains standards for process effluent discharged to municipal sewage systems. Proponents desiring to discharge process effluent other than to municipal sewage systems should contact the NWT Water Board or appropriate land claim management boards.

3.1.2 Non-point Source Discharges

Non-point source discharges may be covered by a water licence from the NWT Water Board. In those cases where they are not, the standards in Schedule II apply.

These standards apply to non-point source discharges from industrial sources to storm sewers, ditches and other areas for containment, routing and disposal. For the purposes of this guideline, non-point sources are directly related to operational areas of the industry.

3.2 Process Residuals

The generator must ensure process residuals such as solid, semi-solid and sludge waste are suitable for disposal to a modified solid waste landfill. A leachate testing method is used to determine the acceptability of process residual for landfill and is designed to simulate the characteristics a material may exhibit if placed in a landfill. Refer to Appendix A for additional details on acceptable leachate test methods.

A process residual should not be landfilled if its leachate contains;

- (i) 100 mg/L or higher of any substance listed in Schedule III or,
- (ii) substance listed in Schedule IV in excess of the concentrations listed in that schedule or,
- (iii) any of the following substances in a concentration greater than 0.001 mg/L:

hexachloro-dibenzo-p-dioxins	pentachloro-dibenzo-p-dioxins	dichlorobenzodioxins
tetrachloro-dibenzo-p-dioxins	hexachloro-dibenzofurans	
pentachloro-dibenzofurans	tetrachloro-dibenzofurans	

With respect to (iii), proponents with benzene or halogenated derivatives other than those listed should contact EPS to discuss management options.

While these requirements may seem complicated, an understanding of the industrial process will help to determine which parameters are of concern.

A waste not meeting the requirements in paragraphs (i), (ii) and (iii) is referred to as a toxic leachate waste. A toxic leachate waste is not suitable to be landfilled and will have to be treated as a hazardous waste. Thus, the generator will need to follow the Guideline for the General Management of Hazardous Waste in the NWT.

3.3 Exemptions

These guidelines cover only waste for which there is not a guideline or regulation already in place. For the management of specific waste types, refer to the Guideline for the General Management of Hazardous Waste in the NWT, or consult EPS.

A proponent may request variances to the above standards. In these cases, the proponent must provide an assessment illustrating the anticipated effect on the municipal infrastructure and the environment to EPS and the municipality. The assessment must indicate that a level of environmental protection equivalent to the guideline is being provided.

4 Waste Management

4.1 Pollution Prevention

Minimizing or avoiding the creation of pollutants and waste can be more effective in protecting the environment than treating them, or cleaning them up after they have been created.

Canadian Council of Ministers of the Environment

Pollution prevention methods are designed to eliminate the creation of waste. Whereas pollution control options treat waste after they have been generated, pollution prevention measures prevent the waste from being created. Pollution prevention includes such actions as substitution and reduction in the use of a raw material, production redesign, process change, in-process recycling and improved operating and maintenance procedures.

4.2 Disposal/Treatment

A flow chart illustrating the decision process for managing an industrial waste under this guideline is provided in Figure 1.

4.2.1 Effluent Discharges

Process effluent and non-point source discharges which meet the standards set in Schedules I or II, respectively, may be discharged to the appropriate system.

Discharges that do not meet the standards will require treatment prior to release. The selection of treatment techniques is beyond the scope of this guideline. Treated effluent that meets the Guideline standards may be discharged. Residuals or sludge from the treatment of effluent will be subjected to the standards outlined in this guideline to determine if they are suitable for landfill.

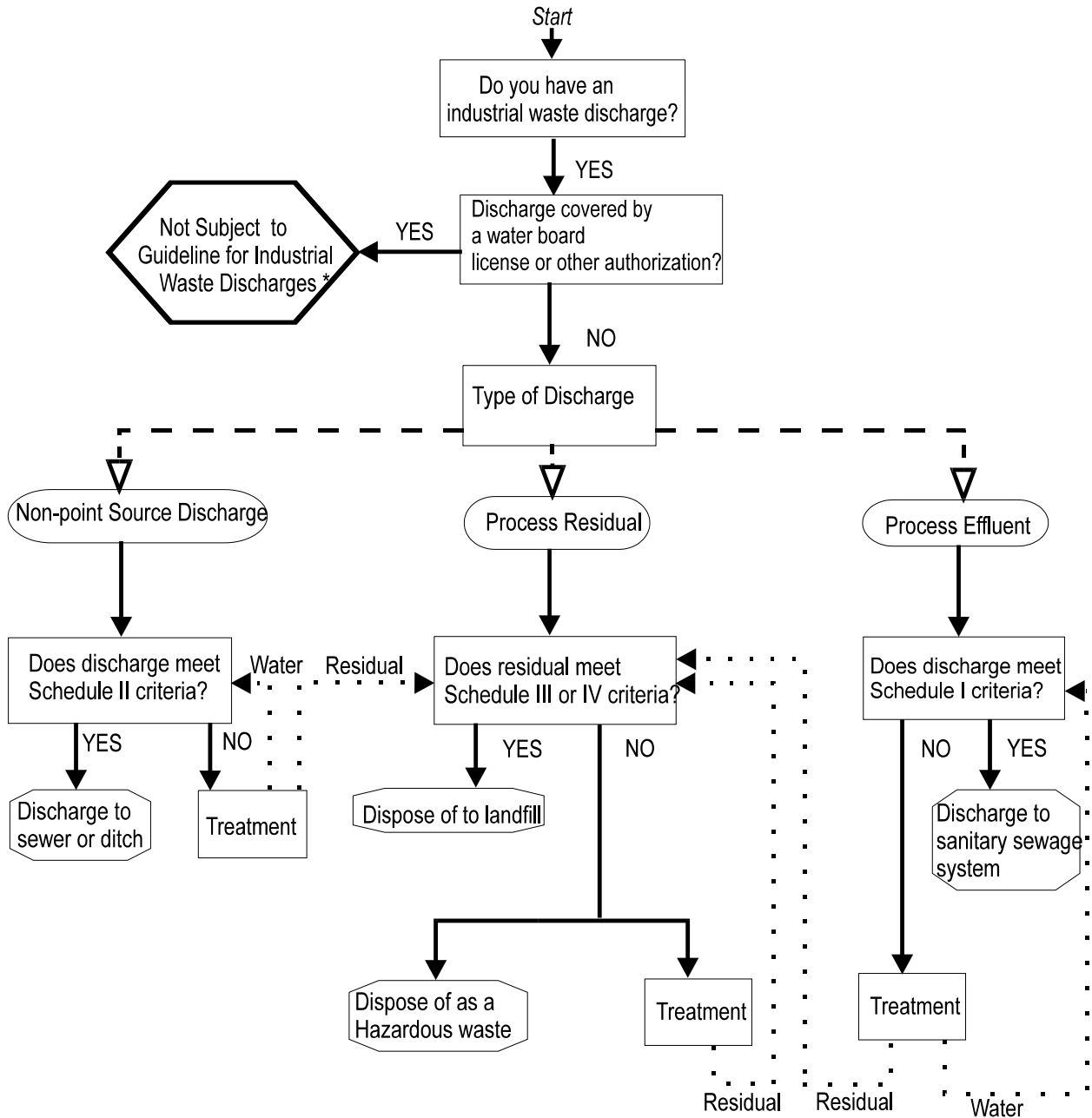
4.2.2 Process Residuals

Process residuals which meet the standards in Schedule III or IV may be disposed at a solid waste modified landfill site.

Process residuals which do not meet the standards will either require treatment or be managed according to the Guideline for the Genreal Management of Hazardous Waste in the NWT. Process residuals that are considered hazardous waste and are moved off site for treatment, storage or disposal must be accompanied by special documentation called a waste manifest. Waste manifests are supplied and administered by EPS.

Process residuals can also be treated to allow them to be landfilled. Treatment of process residuals may result in a significantly different waste. A waste material resulting from the treatment of a process residual will be subject to the standards outlined in this guideline to determine if they are suitable for landfill or sewage disposal.

4.2.3 Containers



* may be subject to other licenses, guidelines or regulations

Figure 1: Decision Flow chart for Managing an Industrial Waste Discharge

Containers containing process residuals or other waste must be properly managed. Containers should be emptied, to the greatest extent possible, using regular handling procedures, or by triple rinsing with an appropriate cleaning agent. They should be rendered unusable by puncturing or crushing prior to disposal. This is especially of

concern for containers which could eventually be used for water or food storage. Rinsings must be managed according to their waste characteristics.

4.3 Alternative Methods

Consideration will be given to proposals for an alternative disposal method that provides a level of environmental protection equivalent to complying with this guideline.

5 Conclusion

This document is intended as a source of basic information about the issues involved in the management of industrial waste discharges. It does not replace the existing legislation which is referenced in the guideline. Please contact the appropriate agency before proceeding.

1. Environmental Protection Service
Department of Resources, Wildlife and Economic Development
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Phone: (867) 873-7654; Fax: (867) 873-0221

2. Lands Administration
Department of Municipal and Community Affairs
Suite 500, 5201-50th Avenue
Yellowknife, NT, X1A 2R3
Phone: (867) 873-8038; Fax: (867) 920-6156

3. Workers' Compensation Board
Box 8888
Yellowknife, NT, X1A 2R3
Phone: (867) 920-3888
Toll Free: 1-800-661-0792;
Fax: (867) 873-4596
Toll Free Fax: 1-866-277-3677

4. Motor Vehicles
Department of Transportation
76 Capital Drive, Suite 201
Hay River, NT, X0E 1G2
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Schedule I: Standards for Process Effluent Discharged to Municipal Sewage Systems

Concentrations not to be exceeded

PARAMETER	EFFLUENT OBJECTIVE (mg/L)
Aluminum	50
Arsenic	1
Barium	5
Biochemical oxygen demand	500
Cadmium	2
Chlorides	1500
Chromium	5
Copper	5
Cyanide	2
Fluoride	10
Lead	5
Iron	50
Mercury	0.1
Nickel	5
Oil & Grease	150
pH range	6.5-10.5
Phenolic compounds	1
Phosphorus	100
Silver	5
Sulphates	1500
Sulphides	2
Suspended solids	600
Tin	5
Zinc	5

Schedule II: Standards for Non-point Sources Discharges**Concentrations not to be exceeded**

PARAMETER	EFFLUENT OBJECTIVE (mg/L)
Aluminum	1
Ammonia	10
Arsenic	1
Barium	1
Cadmium	0.1
Biochemical oxygen demand	15
Chlorine	1
Chromium	0.1
Copper	1
Cyanide	0.1
Fluoride	2
Grease, Fat, Oil	15
Iron	1
Lead	0.05
Mercury	0.0006
Nickel	1
pH range	6-10.5
Phenolic compounds	0.02
Phosphorus	1
Silver	0.1
Suspended solids	15
Tin	1
Zinc	0.5

Schedule III: Standards for Solid Waste/Process Residuals Suitable for Landfill

Leachate test results not to exceed 100mg/l	
Parameter	Parameter
Ammonia sulphide	Maleic anhydride
Benzidine	Methylamine
Benzyl chloride	Potassium permanganate
Diethylamine	Quinoline
Ethylamine	Strychnine
Ethylenediamine	Tetrachloroethanes

**Schedule IV: Standards for Solid Waste/Process Residuals Suitable for Landfill
(based on Leachate quality test results)**

Parameter	Concentration (mg/L)
Arsenic	2.5
Barium	100
Cadmium	0.5
Carbon Tetrachloride	0.5
Chromium	5
Cyanide(free)	20
DDT	3
Endrin	0.02
Heptachlor + Heptachlor epoxide	0.3
Lead (total lead analysis - not based on leachate test results)	600
Lindane	0.4
Mercury	0.1
Methoxychlor	10
Methyl ethyl ketone	200
Metolachlor	5
PCBs	50*
Selenium	1
Silver	5
Tetrachloroethylene	3.0
Toxaphene	0.5
Trihalomethanes	10
2,4,5-TP (Silvex)	1
Zinc	500

*Based on Concentration by Mass

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Appendix A

Toxicity Characteristic Leaching Procedure Test and Equivalents

The Toxicity Characteristic Leaching Procedure Test (TCLP), method 1311, US EPA is the preferred method used for section 3.2 paragraphs (i), (ii) and (iii).

EPS will recognize, as an equivalent test, one of the following:

- Alberta Waste Managers Guide. TCLP extraction test
- Canadian General Standards Board Leachate Extraction Procedure, # 164-GP-1-MP
- Schedule 4 - *British Columbia Waste Management Act - Special Waste Regulation*, Government of British Columbia using Canadian General Standards Board test.
- Schedule 4 - *Regulation 347*
Government of Ontario using Canadian General Standards Board test.
- Schedule III and IV *Environmental Quality Act- Hazardous Waste Regulation*, Gazette officielle du Quebec using Canadian General Standards Board test.